

Botanical Gazette.

Vol. V.

DECEMBER, 1880.

No. 12.

EDITORIAL.—THE OXFORD BOTANICAL GARDEN is pleasantly described by a correspondent of the *American Agriculturist* who is traveling in England. It is said to be the oldest Botanical Garden in England, if not the oldest in existence. It was completed in 1663. "It was pleasant to meet with many of our familiar American plants, conspicuous among which was our Poke or Pigeon-berry. Another home plant was our Cardinal Flower (*Lobelia cardinalis*), the flowers of which were much larger than at home, but not of such an intense scarlet."

THE TORREY BULLETIN has begun the publication of a list of the state and local floras of the United States. The October number contains such a list for the New England States, and as far as we know it is quite exhaustive. Assistance is asked in making the list as accurate as possible.

DR. T. F. ALLEN calls attention to the fact that the same similarity between the floras of Eastern Asia and America is noticeable among the *Characeæ* as has been observed by Dr. Gray with respect to higher plants.

THE SYRACUSE BOTANICAL CLUB still continues to be one of the most active clubs in the country. During the past season they have taken 29 club excursions, and combining profit with pleasure, have realized over twenty dollars from them. An Authors' Party brought them in ninety more, and thus they are able to order an herbarium case, rent a room, and buy some microscopes and books. They are working towards publishing a complete catalogue of the flora of Onondaga county and most certainly deserve all the success that has come to them in such liberal measure.

HABENARIA GARBERI should have been described in the last number of the GAZETTE with "lips longer than the perigone," instead of "lips larger."

MR. A. H. CURTISS has undertaken to collect Baron Eggers' set of West Indian plants and hence will probably issue but one more set of U. S. plants. Those who have felt uncertain about Baron Eggers' specimens will now feel perfectly safe in ordering sets, as Mr. Curtiss' fine specimens are to be seen in almost every herbarium in the country.

A SUMMER ON ROAN MOUNTAIN.—This mountain ever since Dr. Gray's first visit in 1841, has been a *locus classicus* to botanists, though but few have visited it.

Three years ago a party of fifteen from the Nashville meeting of the American Association made the ascent, by invitation of Gen. Wilder, the owner of the mountain, and the writer collected largely at that time. During the past summer an almost continuous scientific convention has been informally assembled on the summit; Profs. Goodale and Gibbs, of Harvard; Prof. T. C. Porter, of Easton; Dr. Leidy and Messrs. Thos. Meehan and Joseph Wilcox, of Philadelphia; Capt. J. Donnell Smith, of Baltimore; Profs. Phillips and Symonds, of Chapel Hill, and Mrs. Geo. Andrews, of Knoxville, being of the number, so that not only the plants but the minerals, the rhizopods, the mollusks and the meteorology were all looked after.

It was the writer's good fortune to remain there from June 25th through July and August, and this article will give some notes of the results of his labors.

The mountain is reached from Johnson City on the East Tenn., Va., & Ga. R. R., and from Marion on the W. N. C. R. R. The former route is by stage 32 miles, and takes from early morn till nearly dark, over a preposterously rough road. The first ten miles lie along Buffalo Creek, through a limestone country, presenting the common plants of the region, the only thing of special botanical interest being *Asplenium parvulum*, on a limestone ledge. Crossing a slight ridge, we strike the waters of Indian Creek, running through a quartzite country, and in less than half a mile the flora undergoes a complete transformation. In a few minutes we are riding through the thickets of *Alies Canadensis* (Hemlock), *Rhododendron maximum*, and *Leucothoe Catesbaei*, called "laurel," and said to be fatal to horses.

Calycanthus floridus is noted, also *Asarum Virginicum*, under the bushes with its glossy evergreen leaves, and *Oxydendron arboreum*, conspicuous with its long white racemes. Ten miles further on we cross Iron Mountain, at an elevation of 1500 feet above the valleys on either side, and see large patches of *Galax aphylla*, with its white spikes, and along the road-side, *Leucothoe recurva*, *Clethra acuminata*, and *Magnolia Fraseri*. From the summit we catch our first glimpse of Roan, and then dashing down the valley of "Big Rocky," four miles bring us to its base, 2900 feet above the sea, and we look up to the summit 3500 feet above us, and seven miles distant by the road.

Between 3000 or 4000 feet of altitude we notice the enormous chestnuts, *Castanea vesca*, one measuring 24 feet in circumference, and hundreds of others five and seven feet around and running seventy or eighty feet without a limb. A little higher *Acer saccharinum*, *Magnolia acuminata*, *Liriodendron Tulipifera*, *Betula excelsa*, *Tilia Americana*, *Aesculus flava* attain enormous dimensions. One specimen of *Prunus serotina* (black cherry) was measured, which was 19 feet in circumference and probably 70 feet without a limb, and straight as a pine.

About sunset we reach the summit, which, unlike the Northern Appalachians, is a smooth grassy slope, containing, perhaps, 1000

acres, with rocky bluffs at the northern and southern ends, a mile and a half apart, named respectively Roan High Knob and Roan High Bluff, rising about 100 feet above the slope, the former reaching an altitude of 3690 feet. The soil is deep, rich and black, the green turf dotted with clumps of *Alnus viridis* and *Rhododendron Catawbiense*. This latter presents one of the most beautiful sights that can be imagined, with its domes of rosy inflorescence 6 and 8 feet in height, and so abundant that the whole mountain top is colored by it. The distinction between this and *R. maximum*, founded on the shape of the leaves and the tomentoseness of young leaves and branches, is hard to be maintained, in many cases. But the color is unlike any of the numerous shades of *R. maximum* and the capsules are smooth, while those of the other are viscid hairy.

The hotel is built of logs, but is comfortable enough for a botanist, and comfortably kept by Mr. L. B. Searle, who engineered the road up the mountain.

The average daily temperature is from 55 to 65 degrees; twice the mercury reached 75 degrees for an hour or two, and once it was 45 degrees. The spring which supplies the house has a temperature of 45 degrees. Roaring fires are in demand morning and evening.

The first thing to be done, was to secure specimens of those early species which were going out of flower. After that, the daily task was to watch the successive blooming of different species, and to explore new localities.

In moist places we find abundantly *Diphylleia cymosa*, *Cardamine Clematitis*, *Saxifraga crosa* and *leucanthemifolia*, *Ligusticum actaeifolium* and *Chelone Lyoni*.

In the woods occur plentifully *Thalictrum clavatum*, *Astilbe decandra*, *Arisaema polymorphum*, the common species on the mountain, with leaflets less acuminate than *A. triphyllum*, and the lateral ones rhomboidal, when not lobed, sometimes one, sometimes two-leaved. *Ilex monticola*, *Vaccinium erythrocarpon*, "a blueberry bush with a cranberry flower," *Menziesia ferruginea*, var. *globularis*, a straggling rusty shrub, with the blossom of a checkerberry, and *Galium latifolium*.

Lower down are found plentifully *Blephilia hirsuta*, *Pycnanthemum montanum*, *Rudbeckia laciniata*, *Cacalia reniformis*, *Monarda fistulosa* and *didyma*, *Lophanthus scrophularicifolius*, *Scutellaria versicolor*, *Veratrum parviflorum*, and many other species more or less common elsewhere.

In the open plains we collect *Trautvetteria palmata*, *Arenaria glabra*, *Houstonia scryphillifolia* (everywhere forming extensive patches, so as to interfere with the grass) *Houstonia purpurea*, var. *montana*, and *Danthonia compressa*. Among the rocks and on the edges of the precipices are found *Paronychia argyrocoma*, *Geum radiatum* and *geniculatum*, *Henckera villosa*, *Sedum Rhodiola* and *telephioides*, *Oenothera glauca*, *Angelica Curtisii*, *Cynthia Dandelion*, var. *montana*, *Vaccinium Constablei*, *Leiophyllum buxifolium*, var. *prostratum*, *Campanula divaricata*, *Cuscuta rostrata*, *Agrostis rupestris*, *Carex aestivalis*, *debilis*, and

juncea, and *Lycopodium Selago*, and under overhanging cliffs, the delicate little *Saxifraga Careyana*.

The most conspicuous and beautiful of all, except, perhaps, the Rhododendron, is *Azalea calendulacea*, with the flame colored blossoms varying from golden yellow to crimson, and seeming as if the mountain side were on fire.

Several excursions to Little Roan, four miles away, and of nearly equal height, gave us in addition and in great profusion, *Delphinium exaltatum*, *Silene Virginica*, *Liatris spicata*, *Rudbeckia triloba*, *Cirsium muticum*, *Castilleja coccinea*, *Physostegia Virginiana*, and *Melanthium Virginicum*, with conspicuous white flowers. A tramp of eight miles to Roaring Rock was rewarded with several fine specimens of *Aconitum reclinatum*, with blossoms rather more blue than white.

Cimicifuga racemosa and *Americana* are abundant everywhere, the latter a month later, succeeding the former and easily distinguished, even at a distance, by the radiate arrangement of its stamens.

The most abundant plant is *Eupatorium ageratoides*, covering the whole mountain for 2000 or 3000 feet of perpendicular height, until replaced below by *Verbesina Siegesbeckii*.

The Compositæ are well represented in local forms. *Solidago spithamea* and *glomerata* are abundant on precipices, *monticola* and *pubens* in open woods, and *Curtisii*, entirely replacing *caesia* on the sides of the mountain. *Nabalus Roanensis*, n. sp. occurs in the clefts of the rocks

Aster Curtisii is found on the sides of Iron Mountain, and was noticed abundantly along the railroad.

Perhaps the most interesting plant is the rare and beautiful *Lilium Grayi*. The specimens found were well marked, 1 to 5 flowered, horizontal, not nodding; segments not at all recurved nor even spreading; the flowers smaller, more truncate in outline, and much darker than *L. Canadense*. The persistent and careful search of all the botanists, with efficient help from many others, brought to light only 10 specimens, all growing in clumps of Alder or Rhododendron, and thus protected against cattle, sheep and hogs, those enemies of all botanists, who bid fair at no distant time to exterminate it from Roan. It is to be hoped that the Peaks of Otter, its other known locality, may not be thus ravaged.

Abies Frascri is plentiful near the summit, and very conspicuous with its abundant erect fringed cones.

The turf is of a most vivid green even in August, and seems to be made up of *Poa annua*, *Danthonia compressa*, and perhaps some early flowering *Carices*. *Poa compressa* occurs on Little Roan.

Several mollusks have been detected on the mountain, by Mrs. Andrews, either very rare, or unknown elsewhere.

A trip to Bakersville, ten miles away, was rewarded by *Helianthus microcephalus* and *atrorubens*, and *Euphorbia Lathyris*, the latter thoroughly naturalized along the roadsides and very conspicuous.

Of most of the species enumerated above I have an abundant

supply, which I will exchange for U. S. species not in my herbarium, or will sell at ten cents a specimen.—J. W. CHICKERING.

CARNIVOROUS PLANTS.—The advance of science and of human insight into the workings of Nature compel us to admit what seems at first almost incredible, that it is as natural and normal for some plants to derive their sustenance from the animal tissues by a true process of feeding, as it is for the animal to feed upon plants and gain maturity and strength thereby.

The fact that certain plants, such as *Drosera*, *Dionea*, *Sarracenia*, *Utricularia* and others, obtain at least a portion of their nourishment from animal food by process of digestion, absorption and assimilation, has been developed more during the last generation than at any previous time, although the peculiarities of one of these plants were known and noted during the latter part of the eighteenth century. Dr. Darwin tells us that the oldest and most valuable paper published previous to 1860 was written by Dr. Roth in 1782. Much has been recorded, in a general way, in our various journals, concerning these plants, but only a small proportion of these papers are of much value.

However, interesting as the discussion of the bibliography of this subject in its various relations and a review of the arguments both for and against the carnivorous characters of these plants, would be, it is not my intention to enter into a consideration of the general subject, even if space would permit, but to simply record my experiments and observations upon the interesting division of these plants—the genus *Sarracenia* and the family *Droseraceæ*. For an extended review the reader is referred to Darwin's work on the "Insectivorous Plants," and also to articles in Gray's *Darwiniana*.

It is the intention to publish these records in series, divided according to the time and purpose of experimenting and observations.

At the head of each series notes explanatory in general of all the experiments enumerated will be given.

SERIES I. Experiments on *Drosera rotundifolia*.

General observations. The plants upon which experiments were instituted in this set were under cultivation. The surrounding conditions were, as near as it was possible to make them, the same as those in which they grow naturally.

The amount of light, moisture and air was regulated with great care. The plants were watered at 8 a. m. and 6 p. m., daily, throughout the entire time of experimenting. It is worthy of note that the plants blossomed also during this time.

As to the size of the leaves and the general vigor of the plants, they were the *finest* specimens that I could find. They were obtained at a lake, three miles west of Ann Arbor, Mich.

EXPERIMENT NO. 1.—A piece of an angle worm was placed upon the center of a leaf at 2 p. m., June 4th, 1879.

15 min. no change.

30 " submarginal tentacles inflecting and a few nearest the substance were touching it.